

MAINTENANCE OF VEGETATION AT THE PAVEMENT EDGE

**A SURVEY OF PRACTICES IN
WASHINGTON, BRITISH COLUMBIA,
CALIFORNIA, IDAHO, IOWA, MARYLAND, MINNESOTA,
MONTANA, OREGON, AND UTAH**

**DRAFT
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Introduction

The purpose of this study is to review the current practices and experience of Washington and a number of other state and provincial government agencies in the maintenance of vegetation on the unpaved shoulder immediately adjacent to highway pavement. The Washington State Department of Transportation (WSDOT) typically maintains this area with herbicides to be free of all vegetation in a two to four foot (or wider) strip along the edge of pavement. When this strip is maintained it is referred to by WSDOT as Zone 1 or the Vegetation Free Zone.

WSDOT is in the process of reevaluating the policy of Zone 1 maintenance and this survey is intended to provide information on personal observations and documented results (if available) of varying practices both internal to WSDOT and in other similar agencies. The reason for reevaluation of WSDOT's Zone 1 maintenance policy stems from concerns over the environmental and human health consequences of herbicide use. Herbicides have traditionally been used as the most economical and efficient means of achieving this policy and WSDOT is looking for ways to minimize herbicide use wherever practical.

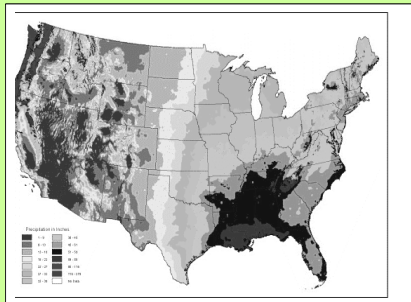
There are a number of factors to consider in relation to maintenance of vegetation at the pavement edge including maintenance costs, safety of maintenance workers and traffic operations, storm water management, and pavement preservation, as well as the potential impacts of herbicides on human health and the environment. Several county governments within Washington State do not maintain a vegetation free zone along their road systems. A previous report¹ surveyed these counties and projected an estimated costs impact to WSDOT maintenance to adopt a regime typical of shoulder maintenance as reported by the counties. Because county roads have less traffic traveling at lower speeds, WSDOT chose to review and compare other state highway maintenance practices in this report.

WSDOT's internal survey posed questions to each of the 24 maintenance areas within the agency to document:

- Pounds of active ingredient and dollars spent on herbicides per centerline mile (WSDOT work operation number 1615);
- Typical width(s) of Zone 1;
- Details on labor, equipment, materials and timing; and annual budget;
- Area where Zone 1 was not maintained by route and milepost;
- Potential or perceived impacts of a "no herbicide" policy;
- Public input to WSDOT maintenance areas on the program; benefits of the existing policies;
- Innovative techniques; and
- Maintenance Areas Superintendent thoughts on the 2003 Clallam County IVM plan and possible implications for their respective programs.

¹ A Comparison of Roadside Maintenance Practices – Impacts of Herbicide Use on Cost and Results, WSDOT December 2003 <http://www.wsdot.wa.gov/maintenance/comparison.htm>

The survey of other states focused on roadside vegetation management costs, Integrated Vegetation Management program details, best practices, whether or not they maintained something equivalent to WSDOT's Zone 1 and, if so, how and where. States were chosen for their similarity to Washington in geography and climate and/or because of similar program characteristics. State maintenance budgets, state maintenance priorities, rainfall, vegetation types, economy, and levels of noxious weed infestation influence roadside vegetation management practices and challenges. Figures 1² and 2³ represent two important environmental conditions that impact how roadsides are managed – rainfall and level of noxious weed infestation.



Washington



The four photos on this page represent typical east/west rural and urban Zone 1 conditions. See WSDOT's *Roadside Classification Plan* for more information on roadside classification and treatments.



Rural Zone 1 Port Angeles



Rural Zone 1 Ephrata



Urban Zone 1 Spokane



Suburban Zone 1 Seattle

Washington State Department of Transportation's Roadside Vegetation Management Program

WSDOT identified implementation of Integrated Vegetation Management (IVM) and development of roadside vegetation management plans as the preferred alternative in an Environmental Impact Statement prepared in 1993.⁴ WSDOT's definition of IVM was further outlined in a 1997 document⁵ and incorporated in a recent update to Chapter 6 of WSDOT's Maintenance Manual⁶. Due to budget constraints and other priorities WSDOT maintenance areas did not begin developing roadside vegetation management plans in the years following the EIS' publication. WSDOT is now completing these plans and will have them completed for all areas of the state by the end of 2007.

To help move IVM forward, WSDOT has developed other program building blocks conducted an herbicide risk assessment⁷ in 2003, a survey of "no-spray" county programs and cost projection in comparison with current WSDOT practices⁸ in 2003, and this survey in 2003 and 2004. This research is based on results from an internal survey and a series of other state surveys. The 2003 risk assessment updated the 1993 toxicological analysis and risk assessment completed for the 1993 Roadside Vegetation Management EIS. That update concluded most of the herbicides used by WSDOT pose a low to very low potential risk to public and environmental health. However, two products were shown to pose a moderate level of potential risk to WSDOT applicators. As a result of these findings, WSDOT discontinued the use of products containing MCPA and is evaluating alternatives for minimizing the use of a second herbicide known as diuron⁹. The comparison with no-spray county roadside maintenance practices concluded that roadside vegetation management with the use of herbicides was less expensive than

⁴ WSDOT's 1993 EIS can be found on WSDOT's web site
http://www.wsdot.wa.gov/maintenance/pdf/Roadside_Vegetation_Management_12-93.pdf

⁵ Integrated Vegetation Management for Roadsides
<http://www.wsdot.wa.gov/maintenance/pdf/IVM.pdf>

⁶ WSDOT's Maintenance Manual
<http://www.wsdot.wa.gov/fasc/EngineeringPublications/Manuals/Final%20MM.pdf>

⁷ WSDOT's Risk Assessment summaries
http://www.wsdot.wa.gov/maintenance/risk_assessment.htm

⁸ A Comparison of Roadside Maintenance Practices – Impacts of Herbicide Use on Cost and Results, December 2003
<http://www.wsdot.wa.gov/maintenance/comparison.htm>

⁹ WSDOT is also adhering to the terms of an injunction concerning mandatory pesticide application buffer zones entered by the United State District Court on January 22, 2004 in *Washington Toxics Coalition et al v. Environmental Protection Agency* (United States District Court for the Western District of Washington at Seattle). WSDOT is limiting the use of diuron within 60 feet specific salmon bearing streams and herbicide use policies have been revised accordingly. See Gray Notebook December 31, 2003 pages 43 – 44 for more information <http://www.wsdot.wa.gov/accountability/graynotebook>.

roadside vegetation management without the use of herbicides, based on how these counties practice roadside vegetation maintenance.

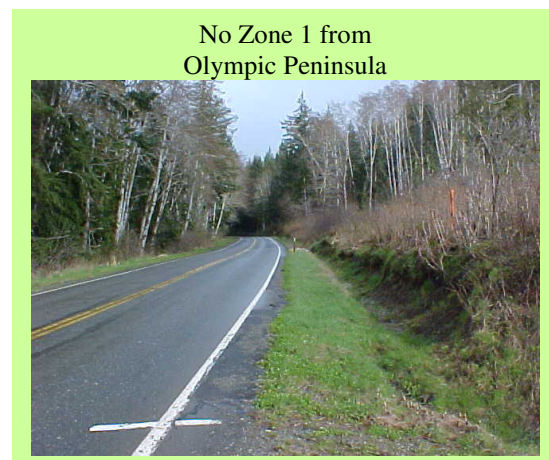
A complicating factor is that roadside practices and vegetation growth patterns in the western half of the state are different from the eastern half due to climate, rainfall, and the nature of the local economy. For example, Western Washington maintenance areas reported one-third the herbicide use of eastern Washington in 2003. The reason for this disparity is due to the Eastern Washington agricultural community that demands and appreciates careful noxious weed control. Western Washington roadside vegetation management focuses on the challenge of fast and dense growing vegetation and allowing stormwater to easily runoff the roadway. Some maintenance superintendents report that maintaining Zone 1 is important now because of how paved roads are designed with a 2% slope and smaller shoulders making water drainage more of a problem. British Columbia and Oregon both face similar economic and climate conditions. Oregon maintains a Zone 1 and British Columbia does not. WSDOT is working with British Columbia on mutual cross-border noxious weed problems out of Okanogan. WSDOT has committed to a statewide Roadside Vegetation Management Plan (RVMP) development and implementation schedule that is to be completed by 2007.

Another key component in WSDOT's implementation of IVM is tracking performance. To accomplish this a record keeping system is being implemented to document site-specific IVM applications and evaluate results over time. This record keeping system is being implemented in conjunction with the development of RVMPs.

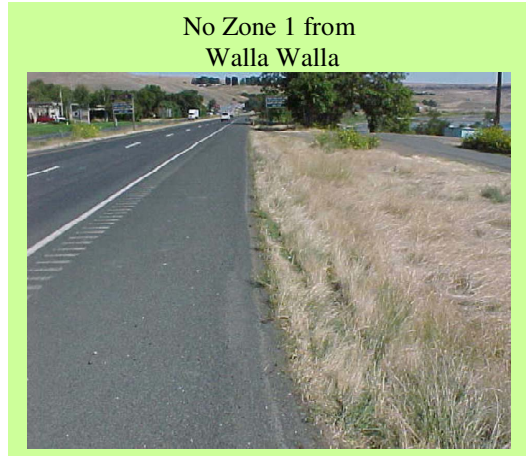
Zone 1 Policy

Approximately sixty percent of herbicides used by WSDOT are applied in Zone 1. Maintenance personnel in the field strongly support current Zone 1 policies. The current Zone 1 policy in Washington State is to use herbicides to eliminate and prevent vegetation from growing in a two to four foot wide bare earth strip adjacent to the pavement. WSDOT Maintenance Superintendents support for using herbicides to maintain the vegetation free zone is based on time; cost; worker and traffic safety; pavement and guardrail preservation; noxious and nuisance weed level of service ratings; state noxious weed regulations; other federal and state environmental regulations; water drainage off the roadway; sight distance; wildlife visibility; fire prevention; and roadside appearance.

The survey also identified exceptions to the Zone 1 policy in sensitive areas or in pilot locations around the state. For example Walla Walla has experimented with amending the soil and allowing



vegetation to grow to the pavement edge and Clallam County has stopped spraying in some areas and mows the grass instead. All future Zone 1 policies will have to strike the right balance between worker and traffic safety, environmental benefits and risks, and costs.



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British Columbia



The Ministry of Transportation relies heavily on mowing and blading edges adjacent to high traffic and primary highways. Vegetation adjacent to the pavement is not removed on secondary routes. Private contractors, according to specifications in 10-year contracts, provide roadside vegetation maintenance. Noxious weed control is under separate contracts. The Ministry has not maintained a Zone 1 since the 1970's. Guardrail is treated manually with weed eater or flail mower. Noxious weed problems are spot sprayed. British Columbia does not use any chemicals for tree and brush control.

Province of British Columbia's Roadside Vegetation Management Program

In the Province of British Columbia, the Ministry of Transportation hires private contractors, to provide roadside vegetation maintenance. Contracts specify mowing and tree and brush control standards.¹⁰ The contracts are lump sum and managed according to performance standards. Due to the nature of the contracts it is difficult to breakout costs and herbicide use trends. The Ministry is developing Best Management Practices for roadside maintenance for contractors. The Ministry discourages the use of pesticides. The roadside manager WSDOT interviewed was interested in loosening the Ministry's restrictions on pesticide use to better control noxious weeds but believed that this change was unlikely.

The Ministry directly employs three region environmental coordinators for pest management plans and records. Noxious weed programs are separate from the contracts. Due to negative press attention about 2-4-D in 1970's the Ministry decided to discontinue the use of 2-4-D and all tree and brush control is conducted mechanically or manually. Guardrail is maintained manually with weed eaters or specialized mowers. The

¹⁰ British Columbia Ministry of Transportation Roadside Vegetation Control Specifications Chapter 4-350 can be retrieved from http://www.th.gov.bc.ca/bchighways/contracts/maintenance/Sched_21_Maint_Specs_Oct30.pdf.

contractors use spot treatments for noxious weeds around guardrail. The Vancouver urban population is very critical of pesticide use and the Ministry relies on inmates to pull weeds. A Vancouver pest management plan is under development.

Mowing For Aesthetics

British Columbia experimented with a “no mowing for aesthetics” policy for two seasons. The public was unhappy with the results and mowing was reintroduced back into the program. Costs were reduced however when contractor specifications were changed and mowing was no longer a pay item.



Zone 1

The Ministry of Transportation has not maintained a Zone 1 with herbicides since the 1970's. However, contractors are required to blade the edge of the roadway on major highways once a year. Vegetation is encouraged for erosion control purposes on secondary roads unless water drainage problems exist. Grading is more common in the wet western part of the province due to the climate that fosters fast growing vegetation. Like eastern Washington, noxious weeds are more of a problem in eastern British Columbia. British Columbia manages vegetation around guardrail manually with a weed eater or specialized mower unless there is a noxious weed problem. If noxious weeds are growing around or under guardrail they treat the vegetation using a spot spray technique.

California



Caltrans maintains the equivalent of Zone 1 in some areas but not others. Areas of Zone 1 are maintained in fire hazard areas and around guardrail and noxious weed infestations. Caltrans treats specific problem areas with a “spot spray” approach. Caltrans’ 2004 roadside vegetation management philosophy is to prioritize roadside vegetation management needs, implement site-specific treatments, use the least hazardous chemicals possible, and to continuously pilot and assess alternatives.

Caltrans Roadside Vegetation Management Program

Caltrans completed an Environmental Impact Review (EIR) of its Integrated Vegetation Management Program in 1992. The EIR set internal policy guidelines, supported by executive management, to reduce pesticide use by 50% by 2000 and 80% by 2012. A high level of energy and time was committed toward meeting the initial goal in 1999 and 2000. The review concluded that the preferred alternative included the use of many techniques to manage roadside vegetation including mowing, mulching, native plantings, chemical, cultural, biological, thermal and structural approaches. Over the years Caltrans has experimented with many alternatives to chemicals including using goats and ladybugs to manage vegetation. Many techniques have proven ineffective and too costly, such as thermal, steam, and specialized mowers. Other techniques have been moderately successful such as weed barriers¹¹ and controlled burns. And still other techniques are being attempted such as planting native low growing ground covers. In Mendocino County, Humboldt County and the City of Santa Cruz, Caltrans stopped spraying Zone 1 except around guardrail or in high-risk areas for workers in 1997. Caltrans has also been using structural approaches such as stamped concrete, asphalt and brickwork to avoid mowing or spraying in the medians and gores. Districts now submit IVM plans electronically each spring.

¹¹ Caltrans, like many states, has been experimenting with weed barriers (also know as bio mats and/or weed fabrics) that are placed under guardrail and contain chemicals that inhibit vegetation for many years.

In the last few years, an alarming number of fire starts in certain counties caused fire marshals and county officials to pressure Caltrans to better manage vegetation to avoid fire starts. As a result, the pesticide use reduction policies were temporarily placed on hold for reevaluation. In addition, Caltrans recommended that districts create a two to four foot vegetation free zones in fire start areas and mow an additional six feet. The districts continue to experiment with a variety of different techniques to help prevent fire, including spraying, mowing, baling and removing chaff (expensive), spraying a growth inhibitor after mowing, reducing mowing, and controlled burns. Caltrans fire prevention activities are impeded by the fact that mowing typically occurs towards the end of the budget cycle when finances, personnel and mowers are in short supply - this limits the ability to mow at the optimal time. Mowers are in demand and not always available when needed. Inmates are hired to assist with brush removal.

Zone 1 Policy

Caltrans Zone 1 policy has been shaped by the 1992 EIR that set herbicide use reduction rates, public pressure in the mid-1990's to reduce the use of herbicides, and the fire start problems that ensued in subsequent years. Caltrans reintroduced a two to four foot Zone 1 in some fire areas to address fire marshal concerns. Caltrans is also pressed to meet stormwater regulations and allow vegetation to slow, filter and absorb runoff. Due to public pressures, Caltrans uses minimal chemical controls in the northern districts near Humboldt County. Mendocino County, Santa Cruz and now Santa Barbara communities are also requesting that Caltrans limit chemical controls (an interesting note is that the City of Santa Cruz adopted a no spray policy that was eventually reversed to include a limited use of chemicals). The overall Caltrans policy toward Zone 1 is to prioritize needs, use herbicides as the last resort, use herbicides selectively, use herbicides with low toxicity, and experiment with all available alternatives whenever possible. Caltrans personnel advised WSDOT to be as proactive as possible, communicate with communities and the press, and to try new approaches to vegetation management practices on a continuous basis.

Idaho



Idaho department of Transportation does not maintain Zone 1 except around guardrail and other hardware on the roadside. The state pays counties to control noxious weeds. Idaho's roadside vegetation management emphasis is on seeding and native plantings.

Idaho Department of Transportation Roadside Vegetation Management Program

Integrated Vegetation Management guidelines are outlined in both the Idaho maintenance and design manuals. Guidelines cover topics including soil amendments, slope stabilization, mowing, brushing, tree planting, seeding methods, species selection, cultural methods, biological methods to noxious weed control. The state contracts with counties to control noxious weeds. Idaho uses GPS and hand held devices to record noxious weed infestations among other things such as stockpiles and gravel pits. Idaho mows at least once in the south and twice or more in the north due to local climates and vegetation growth patterns. Most tree and brush control (70 – 80 percent) is conducted manually. Some of this work is contracted as well. Idaho is experimenting with biocontrol to manage purple loosestrife and knapweed. Idaho DOT serves on weed coordinating committees, weed associations and worked on a statewide strategic plan.

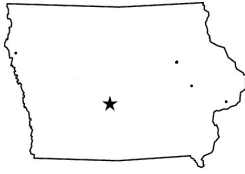
Zone 1

It has been many years since Idaho maintained a Zone 1. According to Idaho's Roadside Program Administrator the decision to allow vegetation to grow to the pavement edge has not been problematic. Two issues that require continued herbicide use, however, are fire starts and noxious weed control. In the drier part of southern Idaho a trial project is testing a pre-emergent herbicide on cheat grass followed by seeding of perennial plants as a way to prevent fire starts on the roadside. Southern Idaho has a noxious weed problem with Kochia and the agency is working with the counties to use natives and perennial

grasses, forbs and shrubs to combat the weed problem. Idaho's policy on treating vegetation around guardrail varies but under no circumstances is alder allowed to grow under guardrail.

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Iowa



Iowa Department of Transportation maintains a six to nine foot wide Zone 1. Herbicide spraying on the roadside is scheduled in the spring around the same time as pavement drop off problems are addressed. The maintenance budget does not always allow for as much spraying treatments as maintenance would like, but the soy and corn agricultural communities supports the Zone 1 program. The topic that is receiving the most attention in Iowa right now is mowing. Due to budget constraints Iowa DOT has created “no mow” zones in medians. The Iowa State Police is concerned that this policy may impact law enforcement capabilities and safety by causing sight distance problems and difficulties crossing the medians.

Iowa Department of Transportation Roadside Vegetation Management Program

The Iowa State Legislature established a formal Integrated Vegetation Management program in the late 1980's. In 1988 Iowa DOT wrote a brief plan and created a roadside coordinator position to manage a grant fund titled the Living Roadway Trust Fund.¹² The department receives a small portion of the fund. Each maintenance area develops a plan for the year. The roadside program manager emphasized preserving pavement from damage caused by weeds and using native plants and grasses to out compete weeds whenever possible. Plantings of prairie flowers (Black Eyed Susan, Partridge Peas and Purple Coneflowers) are a large part of the roadside program. In Idaho's experience it takes five years to establish native plantings that control noxious weeds. There is some public controversy over the cost of these roadside plantings. Despite some of the public controversy, Iowa's IVM program emphasizes grasses and wildflower stands that can be costly and labor intensive to establish and maintain.

¹² For more information on the Living Roadway Trust Fund see the website www.livingroadway.com

A No Mow Policy

Mowing has been a large part of the Iowa DOT roadside program and the agency estimates it spends \$2 million a year on mowing alone. To save on costs, the Iowa State Legislature passed legislation in 2003 that limits mowing on rights-of-way or medians on any primary or interstate highway.¹³

State Police are opposed to the policy and are very concerned about the no mow policy. State police want to be able to cross medians safely and believe the new policy poses impediments to law enforcement in general. Mowing is allowed in noxious weed locations (maintenance crews used to mow a six to eight foot strip adjacent to the shoulders approximately three times a year). When necessary Iowa mows an additional 15 feet for snow control purposes. Iowa contracted out mowing for a period of time but pulled it back in-house in 1999 because they felt the agency could mow at a lower cost to the state.

Zone 1

Iowa maintains a six to nine foot Zone 1 as finances, equipment and personnel allow. In addition, a narrow strip of roadside near the pavement edge is mowed for safety reasons. On roads with lower traffic Iowa maintains a narrower Zone 1 and does not spray the area immediately adjacent to the roadway if its going to rework the shoulder to fix pavement drop off problems. Iowa has stopped using chemical herbicides with long soil residuals such as diuron, and is phasing out imazapyr. Iowa managers recommend that the crews spray in front of guardrail and mow in back of the guardrail to protect workers from being exposed to traffic (eight years ago a mow operator working in the median in a high traffic area near Des Moines was disabled by an out of control vehicle).

¹³ 314.17 Mowing on interstates and primary highways. **On or after January 1, 2003, the department shall not mow roadside vegetation on the rights-of-way or medians on any primary or interstate highway.** Mowing shall be permitted as follows: 1. On rights-of-way which include drainage ditch areas. 2. On rights-of-way within three miles of the corporate limits of a city. 3. To promote native species of vegetation or other long-lived and adaptable vegetation. 4. For establishing control of damaging insect populations, noxious weeds, and invader plant species. 5. For visibility and safety reasons. 98 Acts, ch 1212, §7.

Maryland



Maryland Department of Transportation does not maintain Zone 1 except around guardrail and other roadside hardware. This photo is an example of native species planting project.

Maryland Department of Transportation Roadside Vegetation Management Program

Maryland Department of Transportation developed an Integrated Vegetation Management Plan in 2003. The plan includes management standards, training guidelines, and mowing specifications. Maryland DOT will mow 10 to 12 times a year in the medians and mow roadsides 7 to 9 times a year on highways near Washington D.C.. The current department administrator has emphasized the agency's role as an environmental steward and the department is setting aside acres for regeneration, meadows, reforestation and related research. Maryland DOT is working with the United States Department of Agriculture to combat invasive plant species with biological controls and with National Research Conservation Service to establish native shrubs on the roadside from seed. The DOT has also invested in three new and larger mowers. The roadside program is also uses chemical plant growth regulators (PGR) to keep grass shorter and more manageable.

Zone 1

Maryland Department of Transportation does not maintain a Zone 1. Instead the department encourages vegetation at the edge of pavement for erosion control purposes. Maryland does maintain a Zone 1 around guardrail using herbicides. One district installs biobarriers under guardrail on new construction projects. Maryland believes that herbicides are essential and much cheaper for guardrail maintenance, weed control, and brush control.

Minnesota



Minnesota Department of Transportation does not maintain a Zone 1 and grass is allowed to grow up to the pavement edge. Mowing is heavily relied upon to manage roadside vegetation. Minnesota has decided to measure roadside vegetation management progress and success by measuring acres planted with native vegetation; acres mowed; acres sprayed; pounds of active ingredient herbicides used; weed infestation growth or decline; air emissions from roadside activities; and customer satisfaction.

Minnesota Department of Transportation Roadside Vegetation Management Program

Minnesota Department of Transportation's Integrated Vegetation Management program began informally in 1994 when three districts volunteered to establish annual roadside management plans. Now the majority of districts complete annual work plans although budget shortfalls recently impacted the districts' abilities to keep the plans updated. Mowing is a large part of the roadside program but is limited to an as need basis meaning mowing for sight distance, noxious weed control, honoring maintenance commitments with communities and to enhance native prairie like settings. Shoulders are mowed twice or three times a year. Medians are typically mowed once in the fall. Minnesota spot mows noxious weed patches. There is pressure from Clean Air Minnesota for the department to cut back on mowing due to concerns over dust and exhaust emissions from mowers. New herbicide policies state that to avoid brown outs tree and brush over six feet should be mowed and treated with herbicides if there is regrowth the following season.

Zone 1

Minnesota does not maintain a Zone 1 but does mow grass adjacent to the pavement twice a year. According to the program supervisor winter salt (for ice and snow) applied in highly traveled metropolitan areas kills desirable vegetation at the edge of the pavement. This allows weeds such as common ragweed to take over. Minnesota spot sprays noxious weeds using a selective spray that does not impact grass stands.

Montana



Montana Department of Transportation encourages vegetation adjacent to the pavement and does not maintain a Zone 1 except around guardrail and other roadside features. The counties are paid to control noxious weeds on the roadside.

Montana Department of Transportation Roadside Vegetation Management Program

Montana has many county and statewide Integrated Weed Management plans. The most recent is the Montana Department of Transportation Statewide Integrated Weed Management Plan 2003 – 2008 that was written by the DOT maintenance division and the Montana Department of Agriculture. The plan includes information on purpose and need; overview of legislation; management methods; techniques; strategies for public awareness and weed prevention; research; technology; monitoring and evaluation; and budget. Montana strongly advised against a total no spray program for roadsides (i.e. no spray for roadsides or any activity including noxious weed control) indicating that a no spray experience in Missoula, Montana resulted in a spotted knap weed explosion that could not be corrected. Montana also advised that other states focus on what they want rather than what they do not want (i.e. focus on fostering beneficial plants versus eliminating noxious weeds). Montana is turning to the backpack sprayer more and more with a focus on making very selective, target specific applications for weed control.

Zone 1

Montana mows a 15 foot strip from the pavement edge. The Montana DOT has never applied soil residual pre-emergent herbicides to the area adjacent to the pavement and eight years ago stopped removing or discouraging vegetation adjacent to the pavement. Montana “let’s nature take its course” in non-construction areas and amends the soil and plants beneficial grasses in construction zones. Guardrails and delineators are an exception. Montana maintenance crews use herbicides to remove all vegetation four to six feet under and around guardrail. Alternatives to this method are being tested such as paving under guardrail and piloting a rubber mat beneath guardrail.

1996 Value Engineering Proposal: Topsoil and Seed Surfacing Inslope

In November 1996, Montana Department of Transportation conducted a Value Engineering study comparing vegetation free zones to encouraging vegetation adjacent to the pavement. The County Noxious Weed Act required the department to consider the following language:

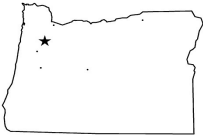
Whenever any person or agency disturbs vegetation on an easement or right of way within a district by construction of road, irrigation or drainage ditch, pipeline, transmission line or other development, the board shall require that the disturbed areas be seeded, planted, or otherwise managed to reestablish a cover of beneficial plants.

In addition, the Value Engineering study of 1996 concluded:

We contacted other state DOT's concerning their present treatments of surfacing inslopes. The majority of eastern, southern and Midwestern states vegetate the inslopes. Vegetating inslopes occurs less frequently among the non-coastal western states. None of the states that do vegetate the inslopes noted any structural or safety problems related to the vegetation.

It was determined that the Design Manual would be revised to require adding (but not importing) salvaged topsoil and seeding to the pavement edge as standard practice. It also determined that "the benefits realized from this proposed change justify the costs that would be incurred." In April 2001 Montana distributed plans and special provision to the contractors that required the placement of topsoil to a depth of 100 mm from the edge of pavement to not less than 0.5 m from the edge of pavement.

Oregon



Oregon Department of Transportation maintains a Zone 1 program that is very similar to WSDOT's. To date there is little interest in making changes to their program.

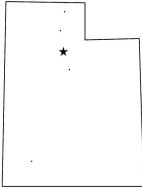
Oregon Department of Transportation Roadside Vegetation Management Program

The Oregon State Legislature has required an Integrated Vegetation Management program since 1993. Oregon Department of Transportation employs 20 Integrated Vegetation Management coordinators that help produce annual district level plans.

Zone 1

Oregon maintains a Zone 1 program that is very similar to WSDOT's. Except in Forest Service areas Oregon maintains a vegetation free zone that is four to twelve feet wide depending on the slope off the roadway and other roadside characteristics. There is some reduction of the use of herbicides by blading Zone 1.

Utah



Utah Department of Transportation does not maintain a Zone 1 except around guardrail and other roadside hardware. Utah phased out a Zone 1 program in one year from 1994 to 1995.

Utah Department of Transportation Roadside Vegetation Management Program

Utah took several steps in the 1990's to reduce mowing, plant native vegetation and develop Integrated Vegetation Management plans. Tree trimming was contracted out and the department focused on revegetation and erosion control, chemical controls of noxious weeds, and mowing.

Zone 1

Utah phased out Zone 1 over the course of the mid 1990s and did not experience significant difficulties related to fire, drainage, or safety. However there was a period of transition for all shoulders where an increased use of selective herbicides was required to control weeds in former Zone 1, while grasses became established. Utah maintenance crews use graders if there are problems with vegetation building up at the pavement edge. Around guardrail maintenance uses the herbicides and biobarriers.

Summary of Findings

British Columbia

- No Zone 1 since 1970's.
- Guardrail treated manually unless there is a noxious weed problem. If needed - spot spray.
- Blade area adjacent to pavement annually on major highways and only if needed on secondary highways.
- No chemicals used for tree and brush control.
- Dropped 2-4-D completely in mid 1970's.
- Attempted to cut back on mowing for two years to save money but due to public outcry mowing is back in the program.
- Separate contract for noxious weed control.

California

- Zone 1 maintained in some areas but not in others such as no-spray counties and other local considerations.
- Zone 1 typically maintained around guardrail.
- Recently reduced emphasis on percentage reductions outlined in 1992 EIS due to fire starts.
- Where maintained Caltrans vegetation free zone is two to four feet. Caltrans mows an additional six feet in fire areas.
- 2004 Roadside Policy: Prioritize roadside vegetation management needs, implement site-specific treatments, use least hazardous chemicals possible, pilot and assess alternatives.

Idaho

- No Zone 1 except around hardware.
- State pays counties to control noxious weeds.
- Emphasis on seeding and using native plants.

Iowa

- Maintain Zone 1 six – nine feet wide as budget allows using a post emergent herbicide application.
- Spraying scheduled at same time as fixing pavement drop off in the spring.
- Iowa has stopped using diuron and is phasing out imazapyr.

- Mow right of way and treat around guardrail.
- Due to budget constraints, DOT is cutting back on mowing program in some areas however the police prefer median mowed for safety and law enforcement reasons.
- Twenty-eight IVM Coordinators statewide.

Maryland

- No Zone 1 except around hardware.

Minnesota

- No Zone 1 except around hardware.
- Mowing heavily relied upon.

Montana

- No Zone 1 except around hardware.
- Encourage vegetation to pavement.
- Emphasis on IVM plans.
- State pays counties to control noxious weeds.

Oregon

- Zone 1 maintained.
- Program similar to WSDOT's.

Utah

- Zone 1 phased out 1994 – 1995 except around hardware

Washington

- Zone 1 is maintained and is two to four feet wide in most locations, wider in some Eastern Washington locations.
- Approximately sixty percent of herbicides used by WSDOT are used in Zone 1.
- Eastern Washington uses three times the amount of herbicides used in western Washington.
- Aside from time, costs, safety and environmental regulations Eastern Washington maintenance crews are predominantly concerned with noxious weed control and Western Washington maintenance crews are predominantly concerned with water drainage off the roadway and maintaining fast growing vegetation.

Vegetation Free Zone

Six out of ten of the states (including British Columbia) interviewed do not maintain a Zone 1 in most locations. British Columbia maintained vegetation around guardrail mechanically or manually while most other states spray underneath and around guardrail. All of these states/provinces had a Zone 1 in the past but have moved away from this approach and now allow vegetation to grow to the pavement edge. Three of the states, Washington, Oregon, and Iowa continue to maintain Zone 1 in most locations throughout their road systems. Oregon and Iowa maintain a Zone 1 that is typically wider on average (four to twelve feet) than Washington. California is aggressively pursuing alternatives to Zone 1 maintenance as a way to reduce herbicide use. California has revised its roadside policy due to fire problems to maintain a vegetation free zone two to four foot wide in unusually high fire starts areas such as Calouse County.

Costs of Alternatives to Herbicides

The costs of using alternatives to herbicides were generally believed (and proven in not well documented pilot cases) to be higher, particularly where mowing was use in place of Zone 1 maintenance. Most of those interviewed contended that vegetation to the pavement edge is the best approach from an environmental standpoint. None of the states surveyed had data or information on impacts to worker or traffic safety.

Herbicide Use Data

Washington has produced excellent spray record trend data that is compiled and published in a quarterly report. No other state tabulated total herbicide use by active ingredient and then published it in a report.

Activity Based Costs

Some states had better activity-based costs than others. For example, California and Idaho appear to have good activity-based maintenance costs. However, none of the states surveyed had comparative data on the alternatives to maintenance of Zone 1.

Methods

In relation to overall roadside vegetation management approaches, all states have some version of an Integrated Vegetation Management program that involves a variety of techniques and testing of alternatives. Mowing is a large part of most roadside programs and also the technique most used to manage vegetation next to the pavement edge. British Columbia required contractors to blade major highways once a year. Utah cut back on its mowing program and saved on maintenance costs in the 1990's. Iowa and British Columbia are currently experimenting with different methods to reduce mowing in order to save costs. Alternatives to herbicides most commonly used include mowing,

weed mats, pavement or other structural bases beneath guardrail, and adding topsoil and planting beneficial plants and grasses.

Performance Measures

Washington and Minnesota have identified performance measures to track Integrated Vegetation Management progress and benefits.

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Contacts

State/ Province	Contact	Title	Phone	E-mail
British Columbia	Al Plaineden	Roadside Manager	(250) 387-7771	al.planiden@gems3.gov.bc.ca
California	Sherry Edwards	Roadside Maintenance Program Manager	(916) 654-5784	sheree_edwards@dot.ca.gov
California	Darold Heikens	Roadside Maintenance/ Design Liaison	(916) 654-4817	darold_heikens@dot.ca.gov
California	Jack Broadbent	Landscape Architect	(916) 653-3170	jack_broadbent@dot.ca.gov
California	Bob Melendez	District Roadside Maintenance Supervisor	(707) 445-6391	Bob_Melendez@dot.ca.gov
Idaho	Cathy Ford	Roadside Program Administrator	(208) 334-8416	cford@itd.state.id.us
Iowa	Joy Williams	Agronomist	(515) 239-1424	joy.williams@dot.state.ia.us
Maryland	Don Cober	Roadside Maintenance	(410) 545-8596	don.cober@sha.state.md.us
Minnesota	Paul Walvatne	Forestry unit Supervisor	(651) 284-3793	Paul.Walvatne@state.mn.us
Montana	Dan Williams	Roadside Program Manager	(406) 444-7604	dawilliams@state.mt.us
Oregon	Will Lackey	Roadside Maintenance Program Manager	(503) 986-3010	William.Lackey@odot.state.or.us
Pennsylvania	Joe Demko	Roadside Maintenance Program Manager	(717) 783-9453	jodemko@state.pa.us

Utah	Ira Bickford	Roadside Program Manager	(801) 965-4119	ibickford@utah.gov
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Utah	Wayne Grzymkowski	Landscape Supervisor - Region 2	(801) 265-9267	
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Utah	Pat McGann	Vegetation Crew Supervisor	(435) 259-7492 x124	
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**WSDOT STATEWIDE ZONE 1 SURVEY
SEPTEMBER 17, 2003**

Respondent:

Region:

Maintenance Area:

Please type your answers directly into the document following each question.

1. How wide is Zone 1 in your maintenance area? Does the width of Zone 1 vary depending on the type of road?
2. Please describe the practice of Zone 1 maintenance in your area/section:

Labor:

Equipment:

Materials:

Timing:

Please explain if techniques vary depending on the road type and traffic conditions.

3. What is your annual budget for maintenance of Zone 1?
4. Are there any exceptions to the typical maintained width or areas where Zone 1 is not maintained? If yes, please list locations by route and milepost along with the reason for each exception:
5. Based on the knowledge and experience in your area, what would be the most significant impacts to highway maintenance and operations if herbicide was no longer allowed for the maintenance of Zone 1?
6. Have you had any questions from the public in your area about your use of herbicides, or requests to reduce/eliminate herbicide use?
7. What do you see as the benefits of your current Zone 1 approach?
Can you quantify any of these benefits?
8. Can you recommend any techniques that would reduce the use of herbicides used in Zone 1? How would you estimate the costs and benefits associated with your recommendation?

9. In your opinion, is Zone 1 necessary in your area, and why? If so, how wide should it be?
10. Last year In Clallam County WSDOT marked 60-foot buffers on all water bodies listed as habitat for listed threatened and endangered species, as well as culverts with flowing water leading to these habitats and is not maintaining Zone 1 within these areas. What would be the impacts of implementing this approach in your area?
11. Do you know of any other roadside policies/practices/innovative techniques that could meet our roadside objectives and reduce the use of herbicides in your area?
12. Is there anything else WSDOT should consider in terms of its Zone 1 policy?

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OTHER STATE DOT ROADSIDE VEGETATION MANAGEMENT AND ZONE 1 SURVEY QUESTIONS

I. Introduction

1. Interviewer
2. State
3. Date
4. Contact Information
5. State Centerline Miles Maintained

II. Costs

1. Total State Maintenance Budget
2. State Roadside Vegetation Budget Overall, and:
 - State Shoulder Mowing budget
 - State Tree and Brush Control Budget (spraying and mechanical)
 - Noxious and nuisance weed control (spraying or other)
 - Roadside Vegetation Management Benefit Cost Analyses
 - Other roadside vegetation programmatic cost

III. Roadside Vegetation Management Program Details

1. Do you have a formal IVM program? If so, what are some of the details of the program (years implemented, documented successes, challenges, changes, costs, public response, etc.)?
2. How often do you mow per season?
3. How do you accomplish tree and brush control?
4. Does the DOT maintain a vegetative free zone adjacent to the pavement edge?

5. If so, how wide is this area (WSDOT's Zone 1)?
6. If so, how (labor, materials, equipment, budget and timing)?
7. What amount of herbicides is applied to roadside vegetation? How often? How is it documented and/or reported?
8. What herbicides are used?
9. Are guardrail areas treated differently? If so, how?
10. Have you completed a cost analysis of herbicide approach versus non-herbicide approach?
11. What are the benefits and costs & advantages and disadvantages of the current roadside vegetation management program?
12. How active are your Noxious Weed Boards and what involvement do they have with your program?
13. What other public involvement exists?
14. Do you have any pilot projects that reduce or eliminate the need for herbicides on the roadside?
15. What practical roadside vegetation management tools have you implemented? How have they worked?
16. What kind of roadside vegetation management training do you provide? How often and at what cost?
17. Do you maintain roadside vegetation management worker safety statistics?
18. Do you have a native plant salvation program?